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Technical Report 479

DEVELOPMENT OF JOB-BASED READING TESTS

John G. Claudy and John S. Caylor
American Institutes for Research

PERSONNEL UTILIZATION TECHNICAL AREA

U. S. Army
Research Institute for the Behavioral and Social Sciences

November 1982

U. S. ARMY RESEARCH INSTITUTE
FOR THE BEHAVIORAL AND SOCIAL SCIENCES

A Field Operating Agency under the Jurisdiction of the Deputy Chief of Staff for Personnel

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REPORT DOCUMENTATION PAGE

READ INSTRUCTIONS BEFORE COMPLETING FORM

1. REPORT NUMBER: Technical Report 479	2. GOVT ACCESSION NO.: AD-A123324
3. RECIPIENT'S CATALOG NUMBER:	
4. TITLE (and Subtitle): DEVELOPMENT OF JOB-BASED READING TESTS	5. TYPE OF REPORT & PERIOD COVERED: Final Report 12/15/77 - 5/13/79
	6. PERFORMING ORG. REPORT NUMBER: AIR - 70500 - 5/79-FR
7. AUTHOR(s): John G. Claudy, John S. Caylor	8. CONTRACT OR GRANT NUMBER(s): DAHC19-78-C-0013
9. PERFORMING ORGANIZATION NAME AND ADDRESS: American Institutes for Research, Post Office Box 1113, Palo Alto, California 94302	10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS: 2Q763731A768
11. CONTROLLING OFFICE NAME AND ADDRESS: US Army Research Institute for the Behavioral and Social Sciences (PERI-RC), 5001 Eisenhower Avenue, Alexandria, VA 22333	12. REPORT DATE: November 1982
	13. NUMBER OF PAGES: 37
14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office):	15. SECURITY CLASS. (of this report): Unclassified
	15a. DECLASSIFICATION/DOWNGRADING SCHEDULE:

16. DISTRIBUTION STATEMENT (of this Report)

Approved for public release; distribution unlimited

17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)

18. SUPPLEMENTARY NOTES

19. KEY WORDS (Continue on reverse side if necessary and identify by block number)

Ability Testing
Reading
Enlistees

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

This report describes the development, validation and standardization of three parallel forms of a short, multiple-choice test of job-related reading skills. The test was built to specifically measure skill in performing Army job reading tasks, i.e., skill at obtaining the information which a soldier needs to perform actual job tasks by reading the Army printed material which is furnished to provide that job information. Each form of the test contains material representing the four types of Army job reading tasks identified in prior research (Locating Job Information in an Index, in Tables and Graphs,

Item 20 (Cont'd)

and in Narrative Descriptions; and Following Directions in Filling in Forms), and the reading passages were drawn equally from Army publications used in job training for six major, high-density MOS areas (Clerk, Combat, Communications, Cook, Mechanics, and Medical). A simplified test format was developed to reduce administrative problems which might hinder some soldiers in taking the test, and testing time was held to forty minutes. Norm tables were developed to convert raw scores to their percentile equivalents in the standard mobilization base population.

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Office, Deputy Chief of Staff for Personnel
Department of the Army

November 1982

Army Project Number
2Q763731A768

Manpower Accession and Retention Systems

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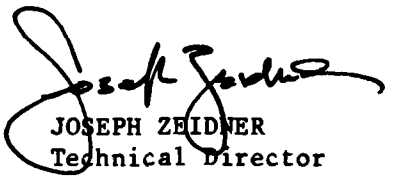
FOREWORD

Can Johnny, or G.I. Joe or Jane, read? More important, can he or she read Army job manuals? These are difficult questions to answer because standardized reading tests use academic-type material that would seldom be encountered on an Army job.

This report describes the development and standardization of a test constructed specifically to measure skill in reading the actual material of Army publications. Sample reading passages are presented from clerical, mechanical, medical, communications, food service, and combat job areas. The test requires only 40 minutes, is machine scorable, and indicates the examinee's skill at reading Army job material, expressed as a single score on the same scale as the Armed Forces Qualification Test (AFQT).

This Job-Based Reading Test is equally appropriate for use in screening applicants at Military Enlistment Processing Stations, or in military units to select soldiers for remedial reading instruction.



JOSEPH ZEIDNER
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DEVELOPMENT OF JOB-BASED READING TESTS

BRIEF

Requirement:

To develop, validate, and standardize three parallel forms of a Job-Based Reading Test related to commonly encountered Army jobs.

Procedure:

The existing Job Reading Task Test consisting of free-response items was used as the basis for contruction of the new shorter multiple-choice Job-Based Reading Test (JRT), with three parallel forms. Items were validated on samples of Army recruits of high and low reading ability. The three forms of the test were standardized at Army Reception Stations, and norms were constructed based on the standard mobilization base population.

Findings:

Three parallel forms of the Job Reading Test; score conversion tables; Administration and Scoring Manual.

Utilization of Findings:

The expected utilization of the JRT is as a screen at the AFEES and to identify soldiers in need of remedial reading instruction.

DEVELOPMENT OF JOB-BASED READING TESTS

CONTENTS

LIST OF TABLES

CHAPTER I
INTRODUCTION

Brief Background

The U.S. Army Research Institute for the Behavioral and Social Sciences has recently supported an extensive program of research and development aimed at identifying job reading tasks essential to learning and performing job duties in the six major MOS areas of Ground Combat, Mechanical, Clerical, Communications, Medical, and Food Services.[1] An integral component of that program was a set of Job Reading Task Tests which was developed specifically to assess performance on Army job reading tasks before and after remedial reading training. While the Job Reading Task Tests were appropriate for use in certain Army contexts, the total test administration time was in excess of 1 hour, and the items were of the free-response, fill-in-the-blank type, which requires expert and slow hand scoring.

Requirements for a New Test

To provide an Army job-based reading test which could be more ly and economically administered and scored, the research reported here as undertaken to develop and standardize a test to meet the following requirements:

1. Reading material would be drawn from each of the six high-density MOS areas of Clerk, Combat, Communications, Cook, Mechanics, and Medical.

2. Each test item would require performance of one of the four categories of Army job reading tasks established in prior research: Locating Job Information in an Index, in Tables and Graphs, and in Narrative Descriptions; and Following Directions in Filling in Forms. All four categories would be represented in each test form.

3. All reading material would be extracted from Army printed materials identified as being used in Advanced Individual Training (AIT) and/or in entry level job performance. No prior knowledge about these jobs is assumed, all required information would be contained in the reading passages.

4. The test would be composed of five-option, machine-scorable, multiple-choice items on a separate answer sheet.

5. Three parallel forms of the test would be prepared.

6. Testing time would be 30-40 minutes.

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[1] T.G. Sticht. A Program of Army Functional Job Reading Training: Development, Implementation, and Delivery System, HumRRO Final Report FR-WD(CA)-75-7, June 1975.

7. Each test form would contain an equal number of items in each of the four categories of Army job reading tasks.

8. Correlation coefficient (validity) of each item would be at least 0.30 with a criterion of general reading ability.

9. Final forms of the test would be standardized on samples of Army enlistees, with the percentage of women to be approximately 10% and of blacks to be approximately 20%.

10. Test norms would be provided for a population constructed to match the standard mobilization base population in terms of AFQT distribution.

CHAPTER 2

DEVELOPMENT OF AN ITEM POOL

Writing Items

The starting point for the development of the Job Reading Test (JRT) was the set of existing Job Reading Task Tests.

The Job Reading Task Tests consist of reading passages containing information needed to answer questions associated with each passage. Parts of the test call for obtaining information from an Index, others from tablular/graphic material, and still others from narrative description. All are reproduced or abstracted from Army publications. A final part consists of a blank Army form, instructions for its completion, and a bill of particulars containing the content information to be used in completing the form. A typical question is "What entry should be made in Space No. 5 of this Form? Stimulus passages vary from one to several pages in length.

As the initial step in test development, the 120 open-ended items of the existing Job Reading Task Test were converted to five-option, multiple-choice format. These were supplemented by further test items based on these same stimulus passages. To insure sufficient items to permit each type of reading task and each MOS area to be represented in the final test, 16 additional reading passages were selected from Army publications and test items pertaining to these passages were prepared. Editorial review was performed by three experienced test constructors, and the draft item sets were revised as necessary. Twenty-four stimulus passages with an average of 12 items per passage comprised the final item pool.

Field Tryout of Draft Items

As an initial check on the "goodness" of this item pool, six tryout sets of items were assembled and administered in a small scale field trial to soldiers entering on their initial duty assignment in the 7th Infantry Division at Fort Ord, California. Each trial form was administered to a group of five soldiers. In these trials, examinees were required to attempt all items within a two hour time limit and to note any questions which they felt were unclear or unfair. In addition, to obtain testing time estimates, the examiner noted the time spent on each section of the test.

Although the small N precludes formal data reporting, the test taking task went smoothly, items were completed at an average rate of better than one per minute, item difficulty appeared satisfactory, and item evaluation identified some defective items. In a one-hour debriefing session for each group, the soldiers reported that they found no procedural difficulties, liked the Army content of the test, and

would accept the test as a fair measure of their ability to read Army materials. On the basis of examinee performance and comments, some items were revised, some were dropped, and the entire testing package was very carefully reviewed.

CHAPTER 3
ITEM VALIDATION

Test Format

In the initial JRT tryouts, each tryout set of the test materials consisted of one booklet containing reading stimulus passages, a second booklet presenting sets of items, and a separate answer sheet. It was quickly apparent that this format was unwieldy. In order to simplify the task of recording the response and to minimize the amount of work surface required, a revised test format was developed for the item validation testing and maintained unchanged into the final forms. In this format the stimulus passages remain in a separate booklet. Both the Question Booklet and a pad of answer sheets are attached to an 11" x 17" cardboard backing sheet. As each page in the Question Booklet is turned, a new set of items is uncovered in the Question Booklet and is automatically aligned with a new column of answer spaces on the answer sheet. The five response options for each item are listed vertically under the item in the Question Booklet, and each is followed by a horizontal dotted line that leads directly to the space on the answer sheet corresponding to that response option.

Statistical Evaluation of Draft Items

For purposes of item validation, four provisional forms of the JRT were assembled from the item pool and administered to trainees at the Reception Station at Fort Dix, New Jersey, in October 1978. Each provisional test form was approximately 75 items in length, contained an approximately equal number of items of each job reading task type, and was comprised of items from each of the six MOS areas. To determine the validity of the individual items, each provisional test form was administered to groups of Army recruits of high and low reading ability.

Since no direct measure of reading ability is routinely available in Army records, and because it was not feasible to administer an additional reading test in this setting, it was decided to use the Field Artillery (FA) Aptitude Area score of the Armed Services Vocational Aptitude Battery as the index of general reading ability. This decision was based on a known correlation of approximately 0.80 between FA and the Metropolitan Reading Achievement Test.

To determine item validity, the provisional forms of the JRT were administered to groups of recruits with high reading ability (FA > 104) and with low reading ability (FA < 96). FA scores are expressed on the Army Standard Score scale (Mean = 100, S.D. = 20), so these groups were selected to be at least one quarter of a standard deviation above and below the mean of the standardization population respectively. In fact, their medians were more than one half a standard deviation away from the population mean, as Table 1 shows.

Table 1

Reading Ability Scores for Item Validation Samples

	Provisional Form A		Provisional Form B	
	Reading Level		Reading Level	
	Low	High	Low	High
FA Range	53-95	105-131	77-95	105-147
FA Median	90.5	115.0	89.0	112.5
N	26	19	20	22

	Provisional Form C		Provisional Form D	
	Reading Level		Reading Level	
	Low	High	Low	High
FA Range	74-95	106-133	62-94	105-133
FA Median	86.0	114.0	85.5	115.5
N	19	19	22	15

Item analysis was performed to yield for each item an index of validity or discrimination, defined in terms of the Phi Coefficient, and of difficulty defined in terms of the proportion of examinees answering the item correctly.

In these data it was not possible to equate the size of the high and low reading groups. Moreover there are many items, sampled from the job reading task domain, which are notably high or low in difficulty. Since the maximum attainable value of the Phi Coefficient decreases markedly as the marginal distributions of the four-fold table depart from equality, the item validity coefficient was obtained by dividing the raw Phi by the maximum value of Phi that it is possible to obtain, given the observed distributions of high and low readers and of subjects passing and failing the item. Thus the corrected Phi represents the obtained proportion of the maximum Phi possible for the observed marginals. Since all items yielding a negative coefficient would be automatically eliminated, Phi maximum was calculated on the basis of the cell distribution that would yield the highest positive value of Phi for the observed marginals.

In summary, 235 or 81% of the 290 items administered in the item validation trial met the criterion of corrected Phi equal to or greater than .30. Of these 235 items, 66% had a corrected Phi of at least .50. For these 235 validated items, the difficulty range in the validation sample was 10% to 97% correct with a mean of 66% correct. Two hundred ten, or 89%, of the items had difficulties in the 40% to 89% range.

CHAPTER 4

FORM ASSEMBLY AND NORMING

Form Assembly

The task of assembling three final parallel forms of the JRT from the pool of validated items was, in substantial part, a matter of inspection and judgment. To permit a testing time of 40 minutes, test length was set at a total of 36 items, divided equally over the four types of job reading tasks. Each form consisted of six parts structured as follows:

Part I	5 items	Narrative
Part II	9 items	Filling in Forms
Part III	5 items	Tables/Graphs
Part IV	4 items	Narrative
Part V	9 items	Index
Part VI	4 items	Tables/Graphs

Table 2 presents for each form of the JRT, the MOS area and the specific source of the material used for each part. The source is listed as the identifying number of the Army Field Manual, Technical Manual, Regulation or Form from which the material was drawn.

Of the twenty-four sets of items administered in the item validation, only two sets failed to yield a sufficient number of validated items to be used in the above test outline. Form A was constructed on the basis of item difficulties to yield a somewhat easy test which maximized discriminations in the lower range of possible test scores. Where items of equal difficulty were available, item choice was based on the item discrimination index. Forms B and C were constructed to parallel as closely as possible the difficulty distribution of Form A. Table 3 presents the distribution of item difficulties for the three forms of the test.

Table 2

MOS Area and Source of Reading Material in Each Form of JRT

Part	Form A	Form B	Form C
I	Combat FM 21-26	Combat FM 23-9	Communications FM 24-18
II	Clerical DA Form 200	Clerical DA Form 3136 FM 10-14	Clerical DA Form 2765-1 AR 710-2
III	Mechanic TM 9-2320-218-20	Medical TM 8-230	Cook Recipe Card L. No. 9 (2)
IV	Cook FM 10-25	Communications FM 24-18	Combat FM 23-11
V	Communications TM 11-381	Mechanic TM 9-2320-209-10	Medical FM 8-10
VI	Medical TM 8-230	Cook Recipe Card L No. 92	Mechanic TM 9-2320-209-10

Table 3

Distribution of Item Difficulties for Final JRT Test Forms

Difficulty* Range	Number of Items		
	Form A	Form B	Form C
20-29	2	2	1
30-39	2	2	4
40-49	3	2	4
50-59	6	6	4
60-69	10	12	10
70-79	8	8	8
80-89	4	3	4
90-99	1	1	1
Mean Difficulty	62.2	62.3	62.3
St. Dev.	16.3	15.8	16.8

* Proportion answering item correctly.

These three final forms of the JRT were then administered in the Reception Stations at Fort Dix, NJ, and Fort Leonard Wood, MO, in February of 1979 to obtain norming data. Following an orientation and briefing by research staff members, the test was administered by Reception Station staff to all non-prior-service personnel being processed through the Reception Station. Approximately 650 examinees were tested in each of the two Reception Stations.

Return of Data from Reception Stations and Initial Processing

After test administration at Fort Dix and Fort Leonard Wood, completed JRT answer sheets and a copy of the AFQT score of record for each examinee were returned for processing. Answer sheets for 1307 examinees, divided approximately equally between the two reception centers, were received.

The first step in processing was to match JRT answer sheets for all examinees with their AFQT percentile scores, for males, and AFWST percentiles for females.[2] During this matching phase 60 cases were dropped from the analysis. Of these 60 examinees, 20 did not have AFQT results and 40 had AFQT data sheets which were blank except for identification information.

[2] AFQT and AFWST percentiles were treated as equivalent and, for convenience, both will simply be referred to as AFQT percentiles or scores in this report.

Following matching, the AFQT or AFWST percentiles were checked for accuracy and corrected where necessary. Fewer than one percent of the recorded scores were found to be in error. After AFQT results were checked, the AFQT percentile score was transferred to the JRT answer sheet which was also coded to indicate the sex and ethnic identification of the examinee and the JRT form which had been administered. During this checking and coding step an additional 16 examinees had to be dropped from the analyses; 15 because the JRT form which they took couldn't be determined, and one examinee whose answer sheet was torn in such a manner that some answers were missing. Table 4 summarizes the disposition of returned JRT answer sheets.

Table 4

Disposition of Returned JRT Answer Sheets

Disposition	Number	Percent
Answer sheets returned	1307	100.0%
Dropped for lack of AFQT data sheets	20	1.5%
Dropped for blank AFQT data sheets	40	3.1%
Dropped for lack of JRT form designation	15	1.1%
Dropped because torn	1	0.1%
Remainder used in analyses	1231	94.2%

Upon completion of all matching, checking, and coding steps, the data on the 1231 retained cases were entered directly into computer storage via a keydisk entry station. The data entered consisted of: AFQT percentile, sex code, ethnic code, JRT form code and complete JRT item responses. As final preparation for initiating data analyses, the accuracy of data entry was verified and corrected as necessary.

Preliminary Analyses and Description of Norming Samples

The first analyses were carried out to determine the characteristics of the 1231 cases retained and to make certain these characteristics satisfied the requirements set out in the statement of work for the project. These results are set out in Tables 5 to 8. Though these tables present results only for the combined sample, distributions for each of the three JRT forms were very similar to each other and thus to the percent distributions shown.

Table 5

Distribution of Examinees by JRT Form

Form	Number	Percent
Form A	416	33.8%
Form B	418	34.0%
Form C	397	32.3%

Table 6

Distribution of Examinees by Sex

Sex	Number	Percent
Females	113	9.2%
Males	1118	90.8%

Table 7

Distribution of Examinees by Ethnic Group

Ethnic Group	Number	Percent
American Indian	16	1.3%
Spanish American	68	5.5%
Oriental	2	0.2%
Black	333	27.1%
White	771	62.6%
Other	41	3.3%

Table 8

Distribution of Examinees by AFQT Decile

AFQT Decile	Number	Percent
1	1	0.1%
2	45	3.7%
3	82	6.7%
4	267	21.7%
5	268	21.8%
6	196	15.9%
7	156	12.7%
8	86	7.0%
9	72	5.8%
10	58	4.7%

The original design of this project required that JRT norms be based on data collected from applicants for enlistment during their processing at AFEES. However, when this became operationally impractical, the design was modified: (1) to permit norming data to be collected from new recruits being processed at Army Reception Stations, and (2) to statistically adjust the norms to reflect the underlying mobilization population. The characteristics of the mobilization population are such that ten percent of the population will fall into each of ten AFQT deciles. Reference to Table 8 clearly indicates that the recruit population passing through the Fort Dix and Fort Leonard Wood Reception Stations during Feburary, 1979, is not representative of the mobilization population because of Army selection standards. The statistical adjustment procedure will be described in the next section of this report.

The original project design also provided for the norming sample to contain no more than 20% black examinees, because that is the approximate percentage of military age black men and women in the U.S., no more than 10% female examinees, because that is the approximate percentage of enlisted jobs the Army has available for women (who are not permitted to serve in combat roles), and that each JRT form be administered to at least 300 examinees. All of these were satisfied except that the percentage of black examinees was exceeded somewhat (27.1% instead of 20.0%). This situation, however, does not present a significant problem since it was taken into account in the calculation of the final JRT norms.

The last step of the preliminary analyses was to calculate certain statistical properties of the AFQT and JRT in the three subsamples to which the JRT forms were administered. These results are presented in Table 9.

Table 9

Subsample Characteristics on AFQT and JRT

	Form A	Form B	Form C
JRT Mean	20.92	22.66	21.53
JRT St. Dev.	7.89	7.39	7.87
AFQT Mean	51.54	52.41	49.24
AFQT St. Dev.	19.30	18.99	19.52
Correlation	.61	.62	.61
N	416	418	397

From these data it is clear that the three subsamples are similar in terms of AFQT distributions and, though not precisely equal in difficulty, the three JRT forms appear to be parallel to each other. Thus it was deemed appropriate to proceed with the calculation of norms for the three forms.

Calculation of Mobilization Population Norms

In order to properly calculate the norms for the JRT forms, it was necessary to divide the AFQT distribution into a discrete number of intervals, the number of intervals being a function of the total number and distribution of available cases. After consideration of several alternatives, 20 intervals was decided upon. In the mobilization population 1/20th, or five percent, of the population would be expected to fall into each of these AFQT intervals. Table 10 presents, for each JRT form, the percent of the available examinees who fell into each of the 20 AFQT intervals.

Table 10

Percent of Norming Subsample Examinees in each AFQT Interval

AFQT Interval	Percent in Category		
	Form A	Form B	Form C
1	0.0	0.0	0.0
2	0.0	0.0	0.3
3	0.2	0.0	0.5
4	2.9	3.3	4.0
5	1.7	1.2	2.8
6	4.8	3.3	6.3
7	9.6	8.1	9.6
8	11.8	13.6	12.3
9	5.8	6.9	8.1
10	17.1	13.4	14.1
11	9.4	9.6	6.5
12	6.5	8.6	7.1
13	6.0	5.0	6.5
14	5.8	7.4	7.3
15	4.3	4.3	2.3
16	3.4	4.1	2.5
17	2.4	3.6	3.8
18	3.1	2.9	1.8
19	3.1	2.6	2.8
20	2.2	1.9	1.5

Having divided the AFQT distribution into 20 intervals the remaining steps of the procedure for calculating the JRT norms are described below:

1. Calculate the JRT mean and standard deviation for the available norming subsample examinees in each of the AFQT intervals (See Table 11).

2. Plot JRT means and standard deviations against AFQT intervals.

3. Smooth the curves plotted in Step 2.

4. For AFQT intervals for which no cases were available or for which mobilization population proportions were grossly underrepresented (mental categories IV and V), project the smoothed curve from Step 3 and obtain predicted means and standard deviations for these AFQT intervals (See Table 12).

5. Using a computer program, for each AFQT interval, generate a sample of 50 constructed JRT raw scores having a normal distribution with mean and standard deviation equal to the smoothed mean and standard deviation determined in Step 4.

6. Combine the 1000 JRT scores (20 intervals x 50 scores per interval) generated in Step 5 into a single distribution. (This distribution is the best estimate of the distribution which would result if the JRT could be administered to a large random sample from the entire mobilization population. It is presented as Table 13.

7. Calculate the percentile corresponding to each raw score in the generated distribution. This is the raw-to-precentile conversion table (i.e., percentile norm) for the JRT form in question; there is a separate table for each form.

Table 14 presents the final raw score to percentile score conversions for each of the three JRT forms. The conversions then represent the relative position of each raw JRT score in a mobilization population defined by AFQT score and with ethnic representative 80% white-20% black, gender division 90% male-10% female.

Table 11

Obtained JRT Means and Standard Deviations by AFQT Interval

AFQT Vigintile	Form A		Form B		Form C	
	Mean	St. Dev.	Mean	St. Dev.	Mean	St. Dev.
1	-	-	-	-	-	-
2	-	-	-	-	15.0	-
3	18.0	-	-	-	14.5	4.50
4	15.0	6.08	16.0	5.07	13.9	6.30
5	15.6	4.98	15.0	6.07	13.4	6.68
6	15.4	5.91	18.5	6.49	17.6	5.87
7	14.4	5.20	16.1	5.83	15.2	7.11
8	17.9	6.67	18.4	6.88	18.8	6.60
9	18.8	6.43	20.4	6.85	17.8	6.44
10	19.4	7.09	20.3	6.27	21.5	6.74
11	20.3	7.01	23.5	5.89	24.4	5.39
12	19.5	8.36	23.7	5.86	23.1	4.78
13	25.5	5.30	26.3	5.19	26.0	4.95
14	24.5	6.36	27.6	4.43	25.8	6.77
15	27.0	4.69	26.0	5.51	29.1	2.51
16	29.2	4.09	30.1	2.36	26.4	7.93
17	29.2	4.45	29.9	3.53	30.6	3.30
18	29.8	3.33	28.7	3.25	28.3	7.02
19	30.1	3.83	32.6	1.72	31.1	5.74
20	32.2	2.74	32.5	2.18	31.2	2.19

Table 12

Smoothed JRT Means and Standard Deviations by AFQT Intervals

AFQT Vigintile	Form A		Form B		Form C	
	Mean	St. Dev.	Mean	St. Dev.	Mean	St. Dev.
1	12.0	3.85	12.4	3.65	12.5	4.19
2	13.0	4.30	13.4	4.20	13.0	4.66
3	13.6	4.67	14.3	4.70	13.7	5.15
4	14.2	5.00	15.1	5.15	14.4	5.60
5	14.5	5.33	16.0	5.55	15.2	5.98
6	15.2	5.70	16.7	5.97	16.0	6.28
7	15.9	6.05	17.5	6.36	16.9	6.51
8	16.8	6.32	18.5	6.60	18.3	6.65
9	17.9	6.66	19.8	6.58	19.6	6.60
10	19.0	7.00	21.4	6.42	21.4	6.47
11	20.3	7.18	22.9	6.14	23.2	6.21
12	22.2	6.92	24.3	5.75	24.5	5.95
13	23.8	6.32	25.5	5.40	25.8	5.71
14	25.4	5.78	26.5	5.04	26.7	5.47
15	26.4	5.23	27.5	4.61	27.4	5.21
16	27.6	4.69	28.6	4.08	28.2	4.95
17	28.8	4.19	29.6	3.48	28.9	4.72
18	29.7	3.67	30.4	2.82	29.7	4.44
19	30.7	3.15	30.8	2.17	30.4	4.08
20	32.0	2.60	31.4	1.56	30.7	3.73

Table 13

Estimated Percent of Mobilization Population Receiving each JRT Raw Score

Raw Score	Form A	Form B	Form C
0	0.0	0.0	0.0
1	0.0	0.0	0.0
2	0.0	0.0	0.0
3	0.0	0.1	0.0
4	0.0	0.1	0.0
5	0.1	0.0	0.2
6	0.3	0.3	0.4
7	0.6	0.6	0.5
8	0.7	1.1	1.5
9	1.9	1.3	2.4
10	3.2	2.1	1.0
11	3.2	2.1	2.0
12	4.3	4.3	3.1
13	4.5	4.0	4.0
14	4.3	4.0	4.0
15	4.5	4.0	5.0
16	5.2	3.6	4.2
17	4.9	4.4	3.9
18	4.7	2.8	3.8
19	3.9	4.1	3.8
20	3.3	3.2	3.2
21	4.3	4.2	3.9
22	2.6	3.4	4.2
23	3.6	3.2	3.7
24	3.3	2.9	4.0
25	3.5	3.8	4.1
26	3.5	4.1	4.7
27	3.6	5.0	4.4
28	3.8	4.9	5.8
29	4.8	6.4	4.8
30	4.6	4.8	4.7
31	4.4	5.9	4.0
32	3.3	5.0	3.8
33	2.5	2.8	2.4
34	1.7	1.0	1.4
35	0.4	0.3	0.6
36	0.5	0.2	0.5

Table 14

Percentiles Corresponding to each JRT Raw Score

Raw Score	Form A	Form B	Form C
0	0	0	0
1	0	0	0
2	0	0	0
3	0	0	0
4	0	0	0
5	0	0	0
6	0	0	0
7	0	0	1
8	1	1	1
9	2	2	3
10	4	4	5
11	7	6	6
12	10	8	8
13	14	12	11
14	19	16	15
15	23	20	19
16	28	24	24
17	33	28	28
18	38	32	32
19	42	35	36
20	46	39	40
21	50	42	43
22	54	46	47
23	56	50	51
24	60	53	55
25	63	56	59
26	67	60	63
27	70	64	68
28	74	69	72
29	78	74	78
30	83	80	83
31	87	85	87
32	92	91	91
33	95	96	95
34	97	98	98
35	99	100	99
36	100	100	100

Table 15 presents the predicted mobilization population mean and standard deviation for each of the three JRT forms.

Table 15

Predicted JRT Means and Standard Deviations for Mobilization Population

JRT Form	Predicted Mean	Predicted St. Dev.
A	21.1	7.38
B	22.1	7.35
C	21.8	7.23

APPENDIX

ADMINISTRATION AND SCORING MANUAL FOR THE JOB READING TEST (JRT)

Description of the Test

This manual contains: 1) a brief description of the nature and purpose of the Job Reading Test (JRT); 2) a brief description of the test materials; 3) the requirements and directions for administering and scoring the test; and 4) instructions for converting raw scores to norm scores.

The JRT measures proficiency in performing Army job reading tasks. The questions asked and the reading passages required to answer these questions have been developed on the basis of an analysis of common job reading tasks encountered in Army MOS training programs and in entry level job performance in high density MOS areas. No technical knowledge is required for this test since the answers to all questions are contained in the reading passages. All reading passages in the test were taken from Army manuals and forms. The questions were validated and the test was standardized on an Army recruit population.

The JRT is a 36-question, multiple-choice test which requires approximately 15 minutes to obtain identifying information and to read the directions and 40 minutes of testing time. There are three parallel forms of the JRT (Forms A, B, and C) which may be used interchangeably, though different scoring keys and norms conversion tables are used with each form.

Test Materials

Each form of the JRT consists of a Materials Booklet, which contains six reading passages, and a Question Booklet containing the corresponding six sets of questions and their multiple-choice response options for that form of the test. Each form is clearly identified on the cover sheet of both booklets.

All forms of the JRT use the same special multiple-choice answer sheet which is provided in pads. Each pad contains several answer sheets. After completing the test, the examinee tears off his answer sheet and the test is immediately ready to use again. The question Booklet and the answer sheet pads are both fastened to a cardboard panel and they are aligned in such a way that the examinee is guided from his response choice for a question directly to the corresponding answer space on the Answer Sheet. This Administration and Scoring Manual contains directions for administering the test, scoring keys for each form with directions for scoring, and percentile norm tables for each form with directions for converting a raw score to a normed equivalent.

Testing Requirements

Only standard testing facilities are needed to administer the JRT.

Each examinee requires one Materials Booklet, one cardboard panel with one Question Booklet and a pad of answer sheets attached and one soft pencil with eraser.

The examiner requires a copy of the directions for administering the test, a timer clock, and a supply of spare pencils.

Approximately 15 minutes are required to obtain identifying information and to read the directions for the test. When the directions and sample questions have been completed, examinees are allowed 40 minutes to complete the test, working at their own pace and proceeding directly from one part of the test to the next.

Directions for Administering the Test

1. Read the directions

In these directions the sections in capital and lower case letters are for the examiner only and are not to be read aloud. The sections in all capital letters are to be read aloud to the examinees.

2. Orientation

After all examinees have been seated, greet them and say:

YOU ARE HERE TODAY TO TAKE AN ARMY JOB READING TEST. THIS IS A TEST OF PROFICIENCY IN READING ARMY MANUALS TO FIND THE INFORMATION NEEDED IN ARMY JOB TRAINING PROGRAMS AND IN PERFORMING ON THE JOB.

IN THIS TEST THE QUESTIONS, AND THE PRINTED INFORMATION NEEDED TO ANSWER THEM, HAVE BEEN TAKEN FROM ARMY TRAINING PROGRAMS AND ARMY JOB MANUALS AND FORMS. THE TEST CONSISTS OF 6 PARTS, EACH PART FROM A DIFFERENT JOB AREA.

IN MARKING THE ANSWER SHEETS, USE ONLY THE PENCIL WHICH YOU WILL BE GIVEN. USE YOUR PENCIL ONLY ON THE ANSWER SHEET --- DO NOT MAKE ANY MARKS IN THE TEST BOOKLETS. IF YOUR PENCIL BREAKS, OR IF YOU HAVE ANY QUESTIONS, JUST RAISE YOUR HAND.

3. Completing the identification information

Distribute a Material Booklet, a cardboard panel with a Question Booklet and a pad of answer sheets attached, and a pencil to each examinee. Then say:

YOU SHOULD HAVE A SEPARATE MATERIALS BOOKLET, A QUESTION BOOKLET AND ANSWER SHEET TOGETHER ON A BOARD, AND A PENCIL. ON THE COVER

OF BOTH YOUR MATERIALS BOOKLET AND YOUR QUESTION BOOKLET IS THE WORD FORM FOLLOWED BY A LETTER --- FORM A, FORM B, OR FORM C. MAKE SURE THAT THE LETTER ON BOTH BOOKLETS IS THE SAME LETTER.

NOW FIND THE BLOCK MARKED FORM # IN THE BOTTOM RIGHT CORNER OF YOUR ANSWER SHEET. FILL IN THE SPACE OPPOSITE THE FORM OF THE TEST WHICH YOU HAVE --- FORM A, OR FORM B, OR FORM C.

Check to make certain that instructions are being followed.

IN THE BLOCK AT THE TOP OF THE ANSWER SHEET THERE ARE 3 SECTIONS: LAST NAME, FIRST NAME, AND MI. START AT THE FIRST BOX AT THE LEFT AND PRINT IN YOUR LAST NAME, ENTERING ONE LETTER IN EACH BOX. IF YOUR LAST NAME HAS MORE LETTERS THAN THE NUMBER OF BOXES PROVIDED, PRINT IN AS MANY AS WILL FIT. SKIP TO THE FIRST NAME COLUMM AND PRINT IN YOUR FIRST NAME. SKIP TO THE LAST COLUMN AND PRINT IN YOUR MIDDLE INITIAL.

NOW NOTICE THAT UNDER EACH OF THESE BOXES THERE ARE TWENTY-SIX SPACES; EACH SPACE IS LABELED WITH A LETTER OF THE ALPHABET. IN EACH OF THESE COLUMNS, YOU ARE TO FILL-IN THE SPACE IDENTIFIED BY THE LETTER ENTERED IN THE BOX ABOVE IT. MAKE CERTAIN THAT YOU FILL-IN THE RIGHT LETTER IN THE COLUMN. IF THE BOX AT THE TOP OF A COLUMN IS BLANK, LEAVE THE COLUMN BLANK. BE CAREFUL NOT TO FILL-IN MORE THAN ONE LETTER IN A COLUMN.

Check to make certain that instructions are being followed.

FIND THE BLOCK LABELED SOCIAL SECURITY # AND PRINT YOUR SOCIAL SECURITY NUMBER IN THE BOXES.

NOW CODE YOUR SOCIAL SECURITY NUMBER BY FILLING IN THE SPACE IN THE COLUMN WHICH IS IDENTIFIED BY THE NUMBER IN THE BOX AT THE TOP. DO THIS NOW.

NOW GO TO THE BLOCK MARKED RACE. INDICATE YOUR RACE BY FILLING IN THE SPACE NEXT TO YOUR RACIAL IDENTITY. YOUR RACE IS WHAT YOU CONSIDER YOURSELF TO BE.

NOW FIND THE BLOCK MARKED SEX AT THE BOTTOM OF THE PAGE AND INDICATE YOUR SEX BY FILLING IN THE APPROPRIATE SPACE.

Check to make certain that instructions are being followed.

THAT COMPLETES THE IDENTIFYING INFORMATION. WE'LL GO AHEAD WITH THE DIRECTIONS FOR TAKING THE TEST.

4. Test Directions

Read the following:

THIS TEST HAS 6 PARTS. EACH PART HAS SEVERAL QUESTIONS WHICH ARE IN THE QUESTION BOOKLET, HERE ON THE BOARD (hold up Question Booklet on cardboard panel). THE READING PASSAGE FOR EACH PART IS HERE IN THE SEPARATE MATERIALS BOOKLET (hold up Materials Booklet). TO TAKE THE TEST, YOU:

1. READ A QUESTION IN THE QUESTION BOOKLET.

2. READ THE MATCHING READING PASSAGE IN THE MATERIALS BOOKLET TO FIND THE ANSWER.

3. SELECT THE BEST ANSWER FROM THOSE GIVEN UNDER THE QUESTION.

4. MARK THAT ANSWER ON THE ANSWER SHEET. DO NOT MAKE ANY MARKS AT ALL IN THE QUESTION BOOKLET.

FOLD BACK THE COVER OF THE QUESTION BOOKLET AND LOOK AT THE TOP OF THE PAGE. THERE, IN THE BOX, YOU'RE TOLD WHAT PAGES TO READ IN THE MATERIALS BOOKLET TO FIND THE ANSWERS TO THOSE QUESTIONS. FOR SOME PARTS OF THE TEST THERE WILL BE JUST 1 PAGE OF READING MATERIAL; FOR SOME PARTS, MORE THAN 1 PAGE. EACH TIME, WHEN YOU MOVE TO A NEW PART IN THE QUESTION BOOKLET, YOU'LL FIND A BOX TELLING YOU WHAT PAGES TO USE IN THE MATERIALS BOOKLET.

NOW DO THE 2 SAMPLE QUESTIONS ON PAGE 1 IN THE QUESTION BOOKLET AND STOP.

After 2 minutes say:

NOW CHECK YOUR ANSWERS TO THE 2 SAMPLE QUESTIONS. THE READING PASSAGE FOR THESE 2 QUESTIONS IS ON PAGE 1 OF THE MATERIALS BOOKLET, AS INDICATED IN THE BOX ABOVE THE QUESTIONS. QUESTION S1 ASKS, "HOW MANY POUNDS DOES THE LOAD COIL ASSEMBLY WEIGH?" THE BEST ANSWER TO QUESTION S1 IS ANSWER B, 2 POUNDS, BECAUSE THE PASSAGE SAYS "THE ASSEMBLY WEIGHS 2 POUNDS." ON YOUR ANSWER SHEET, FOR QUESTION S1, THE SPACE OPPOSITE B SHOULD BE FILLED IN.

QUESTION S2 ASKS, "WHAT PROTECTS THE FACE OF THE CU-260/G?" THE ANSWER TO QUESTION S2 IS ALSO B, END CAPS, BECAUSE THE PASSAGE SAYS, "END CAPS ARE USED TO PROTECT THE FACE..." ON YOUR ANSWER SHEET, FOR QUESTION S2, THE SPACE OPPOSITE B SHOULD BE FILLED IN.

RAISE YOUR HAND NOW IF YOU HAVE ANY QUESTIONS ABOUT HOW TO TAKE THE TEST.

After all questions have been answered, say:

YOU WILL HAVE 40 MINUTES TO ANSWER THE 36 QUESTIONS IN THIS TEST. WHEN YOU FINISH ONE PART, GO RIGHT ON TO THE NEXT PART. IF YOU CAN'T ANSWER A QUESTION, SKIP IT AND COME BACK TO IT LATER. TURN TO PAGE 2 IN YOUR QUESTION BOOKLET AND BEGIN.

Start timing.

Proctors should circulate throughout testing room to help with procedural questions and to insure that answers are being recorded on answer sheet.

After 30 minutes, say:

YOU HAVE 10 MORE MINUTES TO FINISH THE TEST.

After 40 minutes, say:

STOP, PUT YOUR PENCILS DOWN. CAREFULLY TEAR OFF YOUR ANSWER SHEET --- THE TOP ONE --- LEAVING ALL THE BLANK ANSWER SHEETS UNDER IT IN PLACE. CLOSE THE COVERS ON BOTH TEST BOOKLETS AND PUT THE MATERIALS BOOKLET TO THE LEFT OF THE QUESTION BOOKLET. PASS YOUR ANSWER SHEET TO THE AISLE AND LEAVE ALL TEST MATERIALS FACE-UP AT YOUR DESK.

If another JRT testing session does not follow in the testing hall, have examinees pass all their other materials to the aisle.

Dismiss examinees.

After examinees have left, check to make certain that all completed answer sheets have been removed from the answer sheet pad, and that no marks have been made in the testing materials.

Scoring Instructions

Separate scoring keys for each form of the JRT are provided in Table A1. The raw score on the test is the total number of items answered correctly. Any item for which more than one answer is marked is scored as wrong.

Converting Raw Scores to Norm Scores

Raw scores on the JRT may be converted to percentile norm scores by means of the separate norming tables presented in Table A2. To convert a raw score to a percentile:

1. Locate the raw score in the Raw Score column at the left side of the table.

2. Read across that row to find the percentile score in the column for the form of the test that was used.

For example, a raw score of 28 on Form B converts to a percentile of 69.

Table A1

Answer Keys for JRT Form

Item Number	Correct Options		
	Form A	Form B	Form C
1	E	D	B
2	E	D	C
3	B	D	B
4	B	A	C
5	D	E	B
6	A	A	B
7	E	A	A
8	C	E	E
9	D	B	C
10	E	C	D
11	E	A	D
12	C	B	D
13	D	B	A
14	B	D	E
15	E	C	C
16	C	E	B
17	A	D	D
18	D	B	C
19	D	B	A
20	A	E	A
21	B	D	E
22	A	B	B
23	C	E	E
24	E	D	B
25	E	A	A
26	D	B	B
27	C	E	A
28	C	A	E
29	A	C	A
30	B	E	A
31	D	C	E
32	A	A	C
33	E	A	A
34	C	D	B
35	D	D	D
36	A	D	D

Table A2

Percentiles Corresponding to each JRT Raw Score

Raw Score	Form A	Form B	Form C
0	0	0	0
1	0	0	0
2	0	0	0
3	0	0	0
4	0	0	0
5	0	0	0
6	0	0	0
7	0	0	1
8	1	1	1
9	2	2	3
10	4	4	5
11	7	6	6
12	10	8	8
13	14	12	11
14	19	16	15
15	23	20	19
16	28	24	24
17	33	28	28
18	38	32	32
19	42	35	36
20	46	39	40
21	50	42	43
22	54	46	47
23	56	50	51
24	60	53	55
25	63	56	59
26	67	60	63
27	70	64	68
28	74	69	72
29	78	74	78
30	83	80	83
31	87	85	87
32	92	91	91
33	95	96	95
34	97	98	98
35	99	100	99
36	100	100	100